

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Inquiry Concerning the Deployment of)	
Advanced Telecommunications)	
Capability to All Americans in a Reasonable)	
and Timely Fashion, and Possible Steps)	GN Docket No. 04-54
to Accelerate Such Deployment)	
Pursuant to Section 706 of the)	
Telecommunications Act of 1996)	
)	
To the Commission:)	

Via the ECFS

COMMENTS OF IEEE-USA

IEEE-USA respectfully submits its comments in the above-captioned Proceeding (“the NOI”).¹

These comments were developed by the IEEE-USA Committee on Communications and Information Policy and represent the considered judgment of a group of IEEE-USA members with expertise in the subject field.

IEEE-USA is an organizational unit of The Institute of Electrical and Electronics Engineers, Inc., created in 1973 to advance the public good, while promoting the careers and public-policy interests of the more than 235,000 electrical, electronics, computer and software engineers who are U.S. members of the IEEE, and as such is an interested party in this Proceeding.

¹ See NOTICE OF INQUIRY, FCC 04-55, GN Docket No. 04-54, Released: March 17, 2004

INTRODUCTION

1. IEEE-USA submits this contribution based on the IEEE-USA Position Statement “*Accelerating Advanced Broadband Deployment in the U.S.*”,² on the “*Report from the Workshop: This Decade’s (R)evolutionary Telecommunications Paradigm*”³ and on follow-up findings.
2. The results of this activity are directly applicable to the issues addressed in this NOI, but IEEE-USA undertook a broader analysis of advanced telecommunications capability and its potential deployment. We therefore submit that, in the face of profound structural changes in telecommunications, broadband access issues cannot be adequately analyzed and effective measures taken without also addressing the following two additional issues of fundamental importance: (1) avoiding monopolization of transport over the networks, and (2) assuring competition in the provision of content, applications, and services (“CAS”) over the networks. The fact that in 2003 the U. S. ranked 11th among nations deploying broadband conveys a sense of urgency.

² See <http://www.ieeeusa.org/POSITIONS/broadband.html>

³ See <http://www.ieeeusa.org/committees/CCIP/Broadband03report.pdf>

ISSUES FOR INQUIRY

A. What is “Advanced Telecommunications Capability”?

3. *The term “Advanced Telecommunications Capability” should apply to facilities and services using commercially available systems capable of providing cost effective all-encompassing high-performance broadband access of data, graphics, video and voice. A 100 Mbps threshold criterion would be a reasonable choice at this time, although actual capabilities already reached and surpassed 1 Gbps.*

4. The above referenced IEEE-USA Position Statement of February 2003 recommends: *“Policymakers must ensure that Ethernet networks over fiber infrastructures capable of gigabit speeds complemented by broadband wireless technologies be fully considered and fairly evaluated for a prominent role in accelerating advanced broadband deployment in the U.S.”*

5. The supporting detailed information is presented in the above referenced Workshop Report. Developments over the past year validated the presented assessment of advanced broadband deployment and the recommendations based on this assessment. We therefore affirmatively respond to the Commission’s question of whether technology and the marketplace evolved such that the Commission should redefine the term “advanced services” which paragraph 11 of the NOI defines as “speeds higher than 200 kbps in one or both directions.”

6. The new speed criterion for “advanced services,” which the Commission considers setting, will convey an important message about U.S. policy goals and will strongly influence consumer expectations. There seems to be a wide range of consumer

expectations at this time. The majority of Internet users that still use dial-up access are at the low end of consumer expectations, while the progressing deployment of Gigabit Ethernet access networks reflects the high end of customer expectations. In between these two extremes, the unsatisfactory status of broadband access deployment in the U.S. (*see response under item B*) tends to lower the expectations of the majority of current broadband subscribers, as well as the expectations of prospective broadband subscribers. We therefore submit that consumers' expectations based on bandwidths actually in use should not influence setting the threshold criterion for "advanced services."

7. To stimulate large scale broadband access adoption by taking advantage of the commercially available enabling technology, the Commission should set a new "advanced service" threshold at which IP-based services reach their potential of providing all-encompassing broadband access of data, graphics, video and voice. The emerging advanced broadband deployment and planning in the U.S., as well as in some other countries, notably Canada and Japan, suggest a 100 Mbps "advanced service" threshold for the forthcoming Report.

8. The Commission further inquires whether any other attributes, besides speed, are relevant to the definition of advanced telecommunications capability. We submit that the most significant additional attribute is Internet Protocol (IP) compatibility.

B. Is Advanced Telecommunications Capability Being Deployed to all Americans?

9. *Deployment in the U.S. lags substantially behind the capabilities of commercially available cost competitive broadband access systems. Technology push is much stronger than market pull.*

10. The IEEE-USA Position Statement and Workshop Report contain information of relevance to the questions raised in paragraphs 24-26 of the NOI. Progress toward higher speeds and other improvements are in evidence in all existing categories of wired and wireless broadband access systems. Examples of notable technological progress are:

- Digital subscriber line speeds over twisted pair copper lines are increasing. A 100 Mbps rate has been demonstrated at the Fast Net Conference in Santa Clara, California (March 30 – April 1, 2004).
- Wireless local area networks (e.g. Wi-Fi) are progressing from 11 Mbps to 54 Mbps and to 108 Mbps shared capacity, and comparable wireless metropolitan area networks (e.g. WiMax) are being introduced.
- Fiber system capabilities are further improving.
- Point-to-point microwave system speeds progressed to 1 Gbps, and millimeter-wave system speeds to 10 Gbps.
- Free-space optical systems are capable of gigabit speeds.

11. The different existing and emerging wireline and wireless systems complement each other and provide a wide variety of cost effective deployment options and trade-offs in broadband access.

C. Is Deployment Reasonable and Timely?

12. *The fact that fewer than 25% of computer users in the U.S. are subscribed to a broadband service as currently defined by the Commission, and well under 1% use speeds of 100 Mbps or higher, suggests that broadband access deployment in the U.S. is substantially below potential.*

13. A noteworthy symptom of unsatisfactory broadband access deployment by incumbent and competitive service providers is the fact that many enterprises,

municipalities, and school districts are deploying their own advanced networks by default, in the absence of commercial availability.

14. All computer users are actual or potential customers of broadband access services. A useful metric for progress in broadband deployment is thus the percentage of computer users currently subscribing to a broadband access service. The use of available data produces the following results for the proposed metric.

15. According to information received from the Computer Industry Almanac, Inc., as of 12/31/03 there were around 216 million active users of personal computers, laptops and notebooks in the U.S., and around 8 million users of mainframe computers and minicomputers, for a total of 224 million.

16. The Commission's published status of broadband access deployment in the U.S. as of 6/30/03 is 23.5 million *high-speed lines* (32.7% ADSL, 5.2% other wireline, 58.3% coaxial cable, 2.5% fiber, 1.3% satellite or fixed wireless), and 16.3 million *advanced service lines* (15.5% ADSL, 7.5% other wireline, 73.1% coaxial cable, 3.5% fiber, 0.4% satellite or fixed wireless).

17. To derive an estimate of the proposed metric for 12/31/2003, the 06/30/2003 FCC data need to be extrapolated. Using the percentage increases for the first half of 2003 (18% for *high-speed lines*, 32% for *advanced services lines*) results in an estimate of 27.7 million *high-speed lines* and 21.5 million *advanced service lines* as of 12/31/04.

18. Accordingly, as of 12/31/2003, the estimated percentage of computer users subscribing to a broadband service, as currently defined by the Commission, is **12.4% for *high-speed lines***, and **9.6% for *advanced service lines***. If we use the 100 Mbit/s "advanced service" criterion proposed under item A, only deployed fiber and fixed

wireless come into consideration. While a substantial part thereof currently operate at a fraction of their speed limit, upgrades are available. This justifies placing all fiber deployment and a part of the fixed wireless deployment into the “advanced services” category as defined under item A. Extrapolation of FCC data as of 6/30/03 results in an estimate of around 600,000 “advanced service lines” capable of operating at or above 100 Mbps as of 12/31/2003. This amounts to 0.27% of the total computer “population.”

D. What Action Can Accelerate Deployment?

19. *Deployment can be accelerated through proactive regulation, legislation, and implementation.*

20. The IEEE-USA Position Statement “*Accelerating Advanced Broadband Deployment in the U.S.*,” as well as the more recent Canadian counterpart,⁴ elaborate on the need for proactive regulation, legislation, and implementation. Quoting the key recommendation from the IEEE-USA Position Statement: “*Government policies at the Federal Communications Commission, Department of Justice, and Federal Trade Commission, as well as at state and local regulatory and enforcement agencies throughout the U.S, must be established, and actions must be taken to ensure that Ethernet networks over fiber infrastructures capable of gigabit speeds, together with complementary broadband wireless networks, are given a fair marketplace opportunity to prove themselves on their merits as contributors to enhancing the country's national productivity, homeland security and international competitiveness. This will require that possible, non-market, anticompetitive blocking actions by rivals be foreclosed.*”

⁴ See <http://www.broadband.gc.ca/pub/media/nsc/report/index.html>

21. Implementation of this recommendation is urgent because broadband access has become a runaway disrupter phenomenon that requires appropriate regulatory and legislative safeguards, much like the Internet. Market pull in broadband access is sustained and intensified by the unprecedented customer investment in a growing number of ever more powerful consumer products serving as customer premises equipment, e.g. personal computers, laptops, personal digital assistants, digital cameras and camcorders, as well as some networking products (e.g. Wi-Fi cards).

22. The impact of recent regulation, legislation, and enforcement seems to be mixed, at best, and detrimental, at worst. The following fundamental course of action seems to hold greatest promise for the future:

- Retain greatest possible regulatory flexibility in order to allow for unpredictable future service needs, market developments, and technological innovation.
- Further reduce barriers to equitable competition and to deployment of user-owned networks in order to facilitate continuing market restructuring in the public interest.
- Further improve both “property” and “commons” spectrum use models in order to increase spectrum efficiency.

23. An example of possible specific proactive regulatory reform options is the mandate to open common carrier networks, both telephone and CATV, and let demand for access by content suppliers drive increased bit rates.

E. What are Patterns of Consumer Adoption and Usage of Services Utilizing Advanced Telecommunications Capability?

24. *Patterns of broadband access consumer adoption differ greatly in different U.S. market segments. Overall, there is a healthy underlying upward trend tempered by readiness to pay. Growing consumer needs for higher-speed access stimulate innovative approaches to ever more capable and more cost effective broadband service deployment.*

25. An article based on data from The Yankee Group (Matt Richtel, “*In a Fast-Moving Web World, Some Prefer the Dial-Up Lane*”, The New York Times, April 19, 2004, pp. A1&8,⁵ indicates that upgrading from dial-up service to cable modem or DSL service, which is the largest segment of the existing broadband access market in the U.S., is highly price sensitive. This seems to account for the slow decline of the number of dial-up subscribers from the peak around 54 million in 2001-2002, to around 51 million in 2003, and for the projected slow further decline during the 2004-2005 period.

Affordability cannot be the reason because cable modem and DSL subscription fees are negligible in comparison with consumers’ combined spending on peripherals (computers, PDAs etc.) and on telecommunications and CATV services. Accordingly, upgrading to a higher-speed option essentially hinges on the consumer’s readiness to pay, which seems to be lacking. This tends to explain the widespread consumer interest in the rapidly growing “free” (e.g. coffee plus access) Wi-Fi usage.

26. The continuing decline of pricing of commercially available networking products stimulates corporations, municipalities and other entities to deploy their own broadband access networks in order to make high-speed services available to their business,

⁵ See <http://query.nytimes.com/gst/abstract.html?res=F30812FA3A5F0C7A8DDAD0894DC404482>

government, and residential users at more attractive pricing than offered by incumbent service providers. This is a most promising and rapidly growing trend. Illustrative examples of user-owned broadband access networks are the fiber-based Burlington Telecom Project, Burlington, Vermont,⁶ the wireless Allegany County Net,⁷ and fiber-based corporate networks.

27. The availability of higher bit rates to residences has also allowed some corporations to trial and implementation of work-at-home opportunities for their employees using Virtual Private Network technologies over the Internet, providing other side benefits such as less commuting, and other lifestyle enhancements to employees, their families and to their immediate region in which they live. Higher bit rates provide these virtual employees the ability to use work applications that, over lower speed connections, would have intolerable response times. The availability of multi-megabit speeds via CATV offerings today has made this tolerable for many business applications; the availability of 100 Mbps or more would accelerate the ‘virtual employee’ trend.

⁶ See <http://www.burlingtontelecom.com>

⁷ See <http://prime.allconet.org/alconet2/allconetprop.pdf>

F. Does Deployment of Advanced Telecommunications Capability in the United States Impact Our Role in the International Arena?

28. Quoting from the IEEE-USA Position Statement “*Accelerating Advanced Broadband Deployment in the U.S.*”: “***The world today widely recognizes that the rapid deployment of broadband telecommunications networks offers the potential to enhance a country’s national productivity, homeland security, and international competitiveness.***” *The fact that the U.S. is not even among the top 10 countries in broadband access deployment, and seems to be falling further behind, is sufficient indication that our role in the international arena is at risk.*

29. The most relevant comparison may be with our neighbor Canada. In November 2003, The Canadian Radio-television and Telecommunications Commission prepared its Third Annual Report “*Status of Competition in Canadian Telecommunications Markets - Deployment/Accessibility of Advanced Telecommunications Infrastructure and Services.*”⁸ Quoting from the Executive Summary: “*Broadband deployment continued to progress, with approximately 85% of Canadians living in communities that are served by high-speed Internet access. However, the majority (80%) of the rural communities remained unserved. By the end of 2002, more Canadian households had Internet subscriptions (51%) than those that did not. Also, for the first time, there were more high-speed Internet households (28%) than there were households with dial-up subscriptions (24%). Public funding to help seed private sector investment was also available at both the federal and provincial levels based on a variety of funding models, as discussed in the report.*”

⁸ See <http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2003/gic2003.htm>

30. The potential benefits of large-scale high-capability broadband access deployment in the U.S. are exemplified in the Gartner Report “*One Gigabit or BustTM – A Broadband Vision for California*”,⁹ which was prepared for the Corporation for Education Network Initiatives in California (CENIC). In essence: “*Gartner analyzed a baseline forecast of the rise in Gross State Product (GSP) with a level of penetration of broadband increasing from 10 percent per capita to approximately 20 percent per capita over a 10-year forecast period (2000–2010). A second analysis evaluated a 50 percent per capita penetration of broadband over the 10 years stimulated by a broadband initiative. The result was a potential increase of \$376 billion in California’s (GSP) and a potential increase of two million jobs.*” This example serves to underline the need for proactive regulation, legislation and implementation addressed under item D.

Respectfully submitted,

/s/

John W. Steadman, P.E., Ph.D.
President
IEEE-USA
1828 L Street, N.W.
Washington, DC 20036

Please address correspondence relating to this document to:

Deborah Rudolph
Manager, Technology Policy
IEEE-USA CCIP
1828 L Street, N.W.
Washington, DC 20036
d.rudolph@ieee.org

⁹ See <http://www.cenic.org/GB/gartner/Report/contents.htm>